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HEALTH AND SAFETY PLAN
ACCIDENT PREVENTION SAFETY PROGRAM PLAN
INTEGRATED OPERABLE UNITS

DOCUMENT MODIFICATION REQUEST (DMR)

PAGE 1 of 1

Refer to 1-A01-PPG-001 for Processing Instructions
Print or Type All Information (Except Signatures)

1 Date	25 DMR No
1/9/95	95-DMR-ERM-0007 1/17/95

Existing Document Number/Revision	3 New Document Number or Document Number if it is to be changed with this Revision
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Duane Craft/8757/5471/080	EG&G Rocky Flats Plant Integrated Operable Units Health & Safety Plan

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8 Item	9 Page	10 Step	11 Proposed Modifications
1			Add Appendix D following Appendix C

12. Justification (Reason for Modification EJO # TP # etc.)

This OU 9 Addendum to the Integrated Operable Unit Health and Safety Plan has been created to address specific OU 9 health and safety concerns on an individual tank basis, which the orginal Health and Safety Plan did not do

If modification is for a new procedure or a revision, list concurring disciplines in Block 13 and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation organizations are listed in Block 13 then Concurror prints, and signs in Block 14 and dates in Block 15.

13 Organization	14 Print Sign (if applicable)	15 Date (if applicable)
SME	Craig Cowdery Craig Cowdery	1/11/95
Proj Mgr	B. D. Peterman	1/11/95
QA	S LUKER	1/16/95

16 Originator's Supervisor (print/sign/date): Craig Cowdery Craig Cowdery 1/11/95

Assigned SME/Phone/Pager/Location	18 Cost Center	19 Charge Number	20 Requested Completion Date	21 Effective Date
Craig Cowdery/6953/5466/080	3113	989846	1/17/95	1/18/95

22 Accelerated Review? Yes ☐ No ☒ | 23 ORC Review: N/A

24 Responsible Manager (print,sign date): Bruce D Peterman 1/11/95

RF-47940 (5/93)

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DATE _____

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TOC viii	1/12/95	95-DMR-ERM-0004
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Section 6: 2-4, 7-8	1/12/95	95-DMR-ERM-0004
Section 7 4-5	1/12/95	95-DMR-ERM-0004
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Section 9 2	1/12/95	95-DMR-ERM-0004
Section 10: 2-3, 8-9	1/12/95	95-DMR-ERM-0004
Appendix C: SOP 7 7a	1/12/95	95-DMR-ERM-0004
Appendix D	1/18/95	95-DMR-ERM-0007

RFP/ER-TM1-93-OU9.2

FINAL

ADDENDUM TO THE HEALTH AND SAFETY PLAN

Accident Prevention Safety Program Plan

ROCKY FLATS PLANT
Integrated Operable Units
8, 9, 10, 12, 13, & 14
Phase I RFI/RI

Stage One Activities for OU9:
Investigation of Tanks Outside
Large Buildings

U. S. Department of Energy
Rocky Flats Plant
Golden, Colorado

ENVIRONMENTAL RESTORATION PROGRAM

November 1994

FINAL REVIEW AND APPROVAL
OF THE PROJECT HEALTH AND SAFETY PLAN

The Project Health and Safety Plan (HASP) has been written for the use of personnel associated with the environmental restoration site/task project. All personnel will comply with all aspects of this plan as it relates to health, safety, and emergency response

Health and Safety Plan Title:

Addendum to the Integrated Operable Unit Health and Safety Plan -Stage One Activities for OU9, Investigation of Tanks Outside Large Buildings

EG&G Project Manager	Date 11/30/94
Health and Safety Liaison Officer	Date 11-30-94
Environmental Restoration Health and Safety Officer	Date 11/30/94
Jacobs Health and Safety	Date 9-1-94
Jacobs Project Manager	Date 9-1-94

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LIST OF ATTACHMENTS

This addendum has been designed to allow the continued use of the primary Integrated Operable Units Health and Safety Plan ("primary HASP"). Only task-specific hazards and controls are described in this addendum. To allow for efficient use of the addendum in conjunction with the primary HASP, chapter and table numbering remains consistent with the primary HASP. All items in the primary HASP remain in force unless specifically addressed in this addendum.

3.6 PROJECT DESCRIPTION

Modified Table 3-1 presents tank-specific tasks to be performed under this HASP addendum.

4.1 PERSONNEL TRAINING REQUIREMENTS

4.1.1 Preassignment Training

In addition to the 40-hour basic health and safety training required under 29 CFR 1910.120, employees must complete the training listed in Table 4-1 that pertains to their job category and task performed.

5.2 HAZARD EVALUATION

The hazard evaluation is based on the Hazard Release Report, historical data, the OU-9 Work Plan and interviews with process owners and process waste generators. Modified Table 5-2 presents a location and hazard summary by tank.

5.4 PROJECT TASK ANALYSIS

The work to be conducted under this HASP addendum may not be in open areas, and there may be impediments to natural ventilation. All other assumptions and discussions presented in the primary IOU HASP apply to this addendum.

5.4.1 Surficial Soil and 6-Inch Vertical Profile Sampling

(This section has no changes. The sections are repeated for the reader's convenience.)

Surficial soil samples will be obtained from the surface of the ground to a maximum depth of 6 inches. Some soil sample sites may require the removal and patching of asphalt and concrete. Given below are the steps required to perform the work, associated

MODIFIED TABLE 3-1
Summary of Activities
OU9 Original Process Waste Lines

TANK NO.	TANK INSPECTION	HPGe/NaI SURVEY	RESIDUE OR WIPE (1)	VAULT WATER(2)	GROUND-WATER (2)	SURFACE SOIL	BOREHOLE/ SOIL SAMPLES
T-1		X			X		X
T-2, T-3	YES (T-3)	X	X(T-2) X(T-3)	X(T-2)	X	X	X
T-7		X			X		X
T-10	YES	X	X		X		X
T-11, T-30	YES	X	X		X	X	X
T-14, T-16	YES	X	X(T-14) X(T-16)		X		X
T-15, T-17		See T-14, T-16			See T-14, T-16	See T-14, T-16	
T-21, T-22	YES	X	X(T-21) X(T-22)	X	X		X
T-27	NO	See T-21, T-22				X	
T-29	YES	X	X	X	X	X	X
T-40	YES	X	X	X	X		X

Notes

(1) If no residue is present, a wipe sample will be collected Wipe samples will be analyzed only for qualitative radiological analysis
(2) Sample collected only if water is encountered

HPGe = High purity Germanium
IHSS = Individual Hazardous Substance Site
NA = Not applicable
NaI = Sodium Iodide, conducted only if HPGe data indicate anomalies
TBD = to be determined in the field based on HPGe results

TABLE 5-2
Location and Hazard Summary by Tank

TANK NUMBER	LOCATION	VOLUME	CONTAMINANTS	CONFINED SPACE ENTRY	RADIOLOGICAL HAZARDS	OTHER RELATED HAZARDS AND COMMENTS
T-1	South side of Building 122 Tank has been removed	800 gallon underground stainless-steel tank	Trace radionuclides, bleach, soaps, H_2O_2, and some organics	No	No	Known release area Overhead utilities (steam and natural gas), underground utilities are sewer and raw water Area is next to door from Building 122, ground is level covered with asphalt and concrete Possible high pedestrian traffic area
T-2	Beneath and south of Building 441 Tank is in IHSS 122	3,000 gallon underground concrete tank. Three concrete vaults are also associated with T-2	Nitric Acid (HNO_3), HF, hydrofluoric acid (HF) sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid ($C_2H_4O_2$), perchloric acid, ammonium hydroxide (NH_4OH), NaOH, aceton, alcohols, cyclohexane, toluene, xylene, trioctomine, ether, Pu, Am, U, Cm, Be, ammonium thiocyanate, ethylene glycol, and PCBs	No	Yes, in soils and tank. Pu, Am, U, Cm.	Overhead utilities include steam, natural gas, and electrical. Underground utilities include raw water and process waste. Access for drill rig is limited. Vaults are currently locked and tagged out. Currently, approximately 100 gallons of water are in each vault. Ground surface is level and covered with gravel. Possible high pedestrian traffic area
T-3 RFP T-123	South of Building 441 Tank is in IHSS 122	Aboveground 3200 gallon steel tank and a 3,000 gallon underground concrete tank.	Ammonia was stored in aboveground steel tank. The underground concrete tank held HNO_3, HF, H_2SO_4, HCl, $C_2H_4O_2$, perchloric acid ($HC10_4$), $HClO_4$, NH_4OH, NaOH acetone, alcohols, cyclohexane, toluene, xylene, trioctomine, ether, Pu, Am, U, Cr, Be, ammonium thiocyanate, ethylene glycol, and PCBs	No	Yes, in soils and tank. Pu, Am, U, Cm.	Overhead utilities include steam, natural gas, and electrical. Underground utilities include raw water and process waste. Access for drill rig is limited Will need to break piping on south side of steel tank to sample for residue Ground surface is level and covered with gravel. Possible high pedestrian traffic area.
T-7 RFP T-522, T-523	Inside Building 528 tank vault southeast of Building 559 Tanks are in IHSS 159	Two-2000 gallon steel tanks	HNO_3, HF, H_2SO_4, HCl, chromic acid NH_4OH, NaOH, KOH, acetone, carbon tetrachloride, chloroform, 1,1,1-TCA (methyl chloroform), TCE, freon, Pu, Am, U, Cu, Cr, PCBs, pesticides, and herbicides	Yes, if tank is sampled	Yes, in soils and tank. Pu, Am, U	Overhead utilities to the east of Building 528 include steam and natural gas. Underground utilities include process waste, raw water, domestic water, and communication cable The east side of building is a steep grade. Drill rig access may be difficult on east side. Area around Building 528 is high pedestrian and vehicle traffic Building 528 is full anti-c's requirement. Ground surface is pavement and gravel

TABLE 5-2
Location and Hazard Summary by Tank

TANK NUMBER	LOCATION	VOLUME	CONTAMINANTS	CONFINED SPACE ENTRY	RADIOLOGICAL HAZARDS	OTHER RELATED HAZARDS AND COMMENTS
T-10	Inside Building 730 north of Building 776 Tanks are in IHSS 132	Two-4500 gallon concrete underground tanks	CCl_4, TCA, TCE, toluene, Pu, Am, U, tritium, Cd, Cr, and lubricating oils	Yes, sampling tank residues	Yes, in soils and tank. Pu, Am, U, tritium.	Overhead utilities include natural gas, steam, electrical, acid and plenum. Underground utilities include process waste raw water, domestic water and sewer Ground surface is level but drill rig access is limited. Full anti-c's required to enter the building Area is high vehicle and pedestrian traffic zone
T-11/T-30	Inside Building 731 tank vault east of Building 707	Two-2000 gallon concrete tanks and one-23,111 gallon vault	CCl_4, TCA, TCE, chloroethane, freon, Pu, Am, U, Pb, Be, Ta, Ca, Li, calcium, fluoride, lithium chloride, machine oils, lubricating oils, lathe coolant, and ethylene glycol	NA	NA	
T-14 RFP T-68	East of Building 774 in IHSS 124	30,000 gallon concrete underground tank	HNO_3, H_2SO_4, HF, NaOH, KOH, small amounts of various solvents, Pu, Am, U, Fe, Cr, Hg, Ni, Ta, chlorides, oils, and grease Tank has been flushed with water	Yes, if entry into tank	Yes, in soils and tank. Pu, Am, U	Tank manways are sealed locked and tagged out. One way to sample tank is from inside Building 774 in an RCA. Sample point may be from the tank drain line No overhead utilities on east side of building Soil borings will be on level ground. Underground utilities include process waste Area is high pedestrian and vehicle traffic.
T-16 RFP T-66 and T-6	East of Building 774 in IHSS 124 and 125	Two-14000 gallon concrete underground tanks	HNO_3, H_2SO_4, HF, NaOH, KOH, small amounts of various solvents, Pu, Am, U, Fe, Cr, Hg, Ni, Ta, chlorides, oils, and grease Tanks has been flushed with water	Yes, if entry into tank	Yes, in soils and tank. Pu, Am, U	Tank manways are sealed locked and tagged out. The only way to sample tank is from inside Building 774 in an RCA. Sample point may be from the tank drain line No overhead utilities on east side of building Soil borings will be on level ground Underground utilities include process waste Area is high pedestrian and vehicle traffic.

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TABLE 5-2
Location and Hazard Summary by Tank

TANK NUMBER	LOCATION	VOLUME	CONTAMINANTS	CONFINED SPACE ENTRY	RADIOLOGICAL HAZARDS	OTHER RELATED HAZARDS AND COMMENTS
T-21	Inside Building 626 tank vault west of Building 666 in IHSS 164.2	135-gallon concrete floor sump	Soaps, cleaning fluids, U-235, nitrates, and Pu	Yes, sampling sump residue	Yes, in soils and tank vault. Pu and U-235 Potentially fissile	No overhead utilities in immediate area Drill rig access is sufficient, must clear security zone Underground utilities include process waste, sewer and foundation drains. Vault structure is one unit. Access to vault is by manway or lifting off concrete slabs that cover the vault. Water is present in the vault in the spring from infiltration of groundwater and precipitation. Ground surface is level covered with gravel Possible vehicle and pedestrian traffic in area. Rattlesnakes have been known to be in vault.
T-22 RFP T-440 and T-449	Inside Building 626 tank vault west of Building 666 in IHSS 164.2	2-450 gallon SST and 1-100 gallon SST	One of the 450 gallon tanks was used to store waste from rooms 101 and 103 in Building 666 This waste consisted of U and Pu. The other 450 gallon tank stored fissile uranium used for experiments after mixing. The 100 gallon tank stored plutonium used for experiments after mixing	Yes, sampling tank residue	Yes, in soils and tank Pu and U-235 Potentially fissile	No overhead utilities in immediate area Drill rig access is OK, must clear security zone. Underground utilities include process waste, sewer and foundation drains. Vault structure is one unit. Access to vault is by manway or lifting off concrete slabs that cover the vault. Water is present in the vault in the spring from infiltration of groundwater and precipitation. Ground surface is level covered with gravel. Possible vehicle and pedestrian traffic in area.
T-27	North of Building 626 on concrete slab. Tank has been removed	500 gallon portable liquid dumpster	Waste from rooms 101 and 103 in Building 666 Possible U and Pu.	NA	Yes, in soils Pu and U-235	No overhead utilities in immediate area. Drill rig access is OK, must clear security zone. Underground utilities include process waste, sewer and foundation drains

TABLE 5-2
Location and Hazard Summary by Tank

TANK NUMBER	LOCATION	VOLUME	CONTAMINANTS	CONFINED SPACE ENTRY	RADIOLOGICAL HAZARDS	OTHER RELATED HAZARDS AND COMMENTS
T-29 RFP T-207	South of Building 774 and east of Building 703	200,000 gallon above ground steel tank	HNO_3, HF, H_2SO_4 HCl, $C_2H_4O_2$, H_3PO_4, H_2CrO_4, $HClO_4$, cyanic, NH_4OH, NaOH, KOH, CaOH, MgOH, acetone, alcohols, cyclohexane, toluene, xylenes, trioctomine, ether, TCA, TCE, PCE, freon, CCl_4, chloroform, chloroethane, tri-n-octyl phosphine oxide, Pu, Am, U, Cm, Be, Ag, Au, Cr, Ta, Ni, Cd, Pt, Pb, Tl, Zn, Cu, Sn, W, Fe, Hg, Li, Ca, Ce, Mn, Mg, Mo, ammonium thiocyanate, ethylene glycol, PCBs, fluoride, lubricating oil, No 2 and No 6 fuel oil and kerosene	Possibly when sampling tank residue	Yes, in soils and tank Pu, Am, U, Cm	No overhead utilities Underground utilities are process waste. A beehive exists around the northern side of T-29 Access to T-29 is throughthe top of the tank or a manway on the west side of the tank. Manway is three feet from ground surface. Tank is next to cooling tower, noise level is moderate Area is high vehicle and pedestrian traffic zone
T-40	West of Building 869	2-400 gallon concrete underground tanks	H_2SO_4, paint solvents, U-238, Pb, Be, detergents, soap and grease	Yes, sampling tank residue	Yes, U-238 in tank and possible surround soil	No overhead utilities Underground utilities include process waste Door to tanks is welded shut. Some documentation exists on decontamination of tanks when abandoned. Possible pedestrian traffic area.

NOTES.

Am = americium
Be = beryllium
Ca = calcium
CCl_4 = carbon tetrachloride
Cd = cadmium
Cr = chromium
Cu = copper
Fe = iron
HF = hydrofluoric acid
Hg = mercury
H2O2 = hydrogen peroxide
IHSS = individual hazardous substance site
KOH = potassium hydroxide
Li = lithium
NaOH = sodium hydroxide
Ni = nickel
Pb = lead
PCB = polychlorinated biphenyl
Pu = plutonium
Ta = tantalum
TCA = trichloroethane
TCE = trichloroethene
U = uranium
1,1,1-TCA = 1,1,1-trichloroethane

potential hazards, and hazard control measures. Concrete and asphalt removal is addressed in Section 5.4.2. Table 5-3 summarizes the hazards and controls for these activities.

5.4.2 Asphalt and Concrete Removal and Sampling

(This section has no changes. The sections are repeated for the reader's convenience.)

Asphalt and concrete will be removed to collect surficial soil samples in areas covered by asphalt and concrete as well as to sample the asphalt and concrete itself. The size of the pieces to be removed may vary from a 4- to 6-inch diameter coring to a 30- by 30-inch area that may be sawed. Table 5-4 summarizes the hazards and controls for these activities.

5.4.6 Tank Inspections

Tanks will be inspected to visually identify structural failures where past releases or potential releases to the environment have occurred. The inspections will be conducted in accordance with SOP FO.28, Tank and Pipeline Investigations for RFI/RIs. Tank inspections will be conducted from manhole openings, where permissible, to avoid entry into the tanks. Where necessary to open tanks, appropriate lockout/tagout will be ensured first. Table 5-9 presents the steps required to perform the work, associated potential hazards, and hazard control measures.

This task is particularly hazardous when tanks contain acutely toxic materials or require confined space entry for inspection. These tanks possibly include 10, 21, 22, 29 and 40.

5.4.7 Surface Radiation Survey

Surface radiation surveys will be conducted to assess radioactive contamination of surficial materials. Radiological survey techniques for surface soils will include high purity germanium (HPGe) surveys supplemented with sodium iodide (NaI) surveys. The NaI survey will consist of performing a 4-foot-grid survey with NaI detector to delineate specific anomalies detected by the HPGe survey on the ground around the tank. Table 5-10 summarizes the steps, hazards, and controls for these activities.

TABLE 5-3
Surface and 6-Inch Vertical Profile Soil Sampling

Step	Hazard	Controls
Layout of sample plots	Ambient levels of suspect contaminants	Prescreening of sample area for radionuclides and nonradioactive contaminants and use of real-time monitoring.
	Slips, trips, and falls (all tasks)	Employees will wear footwear appropriate for existing conditions and avoid areas where falls are probable.
	Manual material handling (all tasks)	Employees will follow material handling requirements given in Section 5 5.5.
	Cuts, scrapes, and contusions to hands (all tasks)	Employees will wear leather gloves when performing work that may result in cuts, scrapes, and contusions
Removal of over-burden and collection of samples	Ambient levels of suspect contaminants (all tasks)	Personal and real-time monitoring for dusts and organics
	Contact with contaminants Generation of airborne dusts	Use of mist from spray bottles or orchard sprayers to control dust
		Personnel shall wear PPE as specified for each IHSS in Section 8.0
Containerization of sample	Contact with sample	Personnel shall wear PPE as specified for each IHSS in Section 8 0
Decontamination of equipment	Splashing of decontamination solutions	Personnel shall wear safety glasses with side shields in addition to PPE specified in Section 8 0
		Personnel coming into contact with contaminated wastes shall immediately go through decontamination

Notes PPE = Personal Protective Equipment

TABLE 5-4
Asphalt and Concrete Removal and Sampling

Step	Hazard	Controls
Set up of asphalt and concrete saw or coring machine	Ambient levels of radioactive and nonradioactive contamination (all tasks)	Prescreening for contaminants (radioactive and nonradioactive)
	Manual material handling (all tasks)	Personnel shall follow material handling requirements given in Section 5.5.5.
	Cuts, scrapes, and contusions (all tasks)	Personnel shall wear leather work gloves while performing work.
Cutting/coring of asphalt or concrete	Generation of airborne dusts	Personnel shall use personal protective equipment as outlined in Section 8.
		Misting shall be used to control dust.
	Contact with moving parts	All moving parts shall be guarded as recommended by the equipment manufacturer
	Overexposure to contaminants (all tasks)	Real-time and personal sampling shall be used as outlined in Appendix A.
	Cuts, scrapes, and contusions (all tasks)	Personnel shall wear leather work gloves while performing work
	Cuts, scrapes, and contusions (all tasks)	Personnel shall wear leather work gloves while performing work
Removal of asphalt or concrete	Manual material handling	Personnel shall follow the material handling requirements given in Section 5 5 5
	Overexposure to contaminants	Real-time and personal sampling shall be used as outlined in Appendix A
Patching of hole	Contact with patching material	Follow precautions given in material safety data sheets for patching product.
	Impact with flying chips or particles	Employees shall wear face shield and leather gloves in addition to PPE specified in Section 8
	Overexposure to contaminants	Real-time and personal sampling shall be used as outlined in Appendix A

TABLE 5-9
Tank Pipeline Inspections

STEP	HAZARDS	CONTROLS
Visual Inspection	Slips, trips, and falls	Personnel shall follow procedures in Section 5.5.6.2. Personnel working at heights will comply with EG&G Health & Safety Practices Manual 22.05.
	Confined space entry	Personnel will follow procedures in Section 5.5.12.
		Lock-out/tag-out procedures will be followed by personnel in Section 5.5.13.
	Illumination	Illumination requirements in Section 5.5.16.
	Bees	Personnel will follow requirements in Section 5.6.2.1.
	Contact with contamination on interior of tank.	Personnel will wear PPE per Appendix A and RWP.

Notes:

PPE = Personal Protective Equipment
RWP = Radiological Work Permits

TABLE 5-10
Surface Radiation Survey

STEP	HAZARDS	CONTROLS
Layout of survey grids and stations	Slips, trips, and falls	Personnel wil follow procedures in Section 5.5.6.2.
	Contact with contaminants	Radiological monitoring per Radiological Work Permits Personal Protective Equipment per Appendix A.
	Heat/cold stress	Heat/cold stress procedures in Section 5.5.9.

5.4.8 Residue and Wipe Samples

To help characterize Original Process Waste Line (OPWL) wastes, residue samples will be collected from each abandoned tank that has not been cleaned since its removal from process waste service. In instances where no residue is present, one wipe sample will be taken from the interior surface of the tank (preferably at the base of the tank or near pipeline connections). Where possible, residue or wipe samples will be collected remotely to mitigate the need for entry into confined spaces. Pipes will be accessed through valves or by unbolting connections. No pipe cutting is planned.

Table 5-11 summarizes the steps, hazards, and controls for these activities.

This task is particularly hazardous when tanks contain acutely toxic materials or require confined space entry for sampling. These tanks possibly include 2, 3, 10, 21, 22, 29 and 40.

5.4.9 Vault Water/Groundwater Sampling

Sampling of incidental surface water or groundwater will be conducted to characterize potential contamination of valve vaults that are associated with OPWL tanks. Table 5-12 summarizes the steps, hazards, and controls for these activities.

5.4.10 Soil Boreholes

Boreholes will be drilled and sampled to identify areas of contamination adjacent to a tank location. Areas beneath or near external connections and openings and near joints or corners around underground tanks will be targeted as primary borehole locations. As a general rule, boreholes will be drilled on each accessible side of the tank or vault, as close as possible to the tank or vault. For locations where the tanks were removed, a single borehole will be drilled as close as possible to the center of the original tank location. Soil samples will be collected from each borehole. Table 5-13 summarizes the steps, hazards, and controls for these activities.

5.4.11 Groundwater Sampling

Groundwater sampling using a HydroPunch® sampler or equivalent in soil boreholes drilled into the saturated zone will be conducted to characterize potential contamination of the groundwater. Table 5-14 summarizes the steps, hazards, and controls for these activities.

TABLE 5-11
Residue and Wipe Samples

STEP	HAZARDS	CONTROLS
Access tank/pipe interior	Slips, trips, and falls	Personnel will follow procedures in Section 5.5.6.2.
	Confined space entry	Confined space entry procedures in Section 5.5.12.
		Lock-out/tag-out procedures in Section 5.5.13.
Sample collection	Exposure to contaminated air	Monitoring per Section 6 and Appendix A
	Heat and cold stress	Temperature stress procedures per Section 5.5.9.
	Illumination	Illumination procedures in Section 5.5.16.
	Additional hazards contained in Step 1	Additional controls contained in Step 1
	Contact with potentially contaminated residues or air	Personnel will use PPE and perform monitoring per Appendix A and RWP.
	Snake bites	Personnel will wear knee-high boots in vaults where snakes have been identified as a hazard. Personnel will ensure adequate illumination before accessing any area and will use a probe to determine if snakes are in an area before reaching or stepping into an area. If rattlesnakes are detected in an area requiring access, personnel will evacuate the area. See Section 5.6.3.
Equipment decontamination	Contact with potentially contaminated rinse water	Personnel will use PPE as required in Section 9.0.

TABLE 5-12
Vault Water Sampling

STEP	HAZARDS	CONTROLS
Access vault interior	Slips, trips, and falls	Personnel will follow procedures in Section 5.5.6.2.
	Confined space entry	Confined space entry procedures in Section 5.5.12.
		Lock-out/tag-out procedures in Section 5.5.13.
	Radiological and chemical exposure	Personnel monitoring per Section 6 and Appendix A. Personnel will use PPE as required in Appendix A and RWP.
Sample collection	Radiological and chemical exposure	Personnel monitoring per Section 6 and Appendix A. Personnel will use PPE as required in Appendix A and RWP.
	Illumination	Illumination procedures in Section 5.5.16.
	Additional hazards contained in Step 1	Additional controls contained in Step 1.
	Heat and cold stress	Temperature stress procedures per Section 5.5.9.
Equipment decontamination	Contact with potentially contaminated rinse water	Personnel will use PPE as required in Section 9.0.

TABLE 5-13
Soil Boreholes

STEP	HAZARDS	CONTROLS
Lay-out of survey grids and stations	Slips, trips, and falls	Personnel will follow procedures in Section 5.5.6.2.
	Contact with contaminants	Radiological monitoring per Radiological Work Permits (RWP).
Sample collection	Exposure to contaminated air	Monitoring per Section 6 Appendix A and RWP.
	Mechanical & hydraulic hazards	Heavy equipment procedures contained in Section 5.5.1.
	Heat & cold stress	Temperature stress procedures per Section 5.5.9.
	Underground utilities	Utility clearance will be performed per Section 5.5.3.
	Aboveground utilities	Comply with procedures in Section 5.5.2.
	Manual material handling	Lifting practices per Section 5.5.5.
	Additional hazards contained in Step 1	Additional controls contained in Step 1
Soil borehole sampling	Contact with potentially contaminated soils	Personnel will use PPE as required by Appendix A and RWP.
Equipment decontamination	Contact with potentially contaminated rinse water	Personnel will use PPE as required by Section 9.0.

TABLE 5-14
Groundwater Sampling

STEP	HAZARDS	CONTROLS
(1) Lay-out of survey grids and stations	Hazards same as soil boreholes. Refer to Table 5-13.	Controls same as soil boreholes. Refer to Table 5-13.
(2) Sample collection	Hazards same as soil boreholes. Refer to Table 5-13.	Controls same as soil boreholes. Refer to Table 5-13.
(3) Groundwater sampling	Contact with potentially contaminated groundwater.	Personnel will use personal protective equipment as required by Appendix A.
(4) Equipment decontamination	Contact with potentially contaminated rinse water.	Personnel will use PPE as required by Section 9.0.

5.5.12 Confined Space Entry

Tasks performed under this HASP addendum may include confined space entries for tank inspections or for residue sampling. The Project Task Analysis reviews tasks and hazard controls for confined space entries. Table 5-2 identifies tanks that are likely to involve confined space entries. All confined space entries will be performed according to the Rocky Flats Health & Safety Practices Manual 6.04 and the Jacobs Engineering's procedure for confined space entry (Appendix D in Primary HASP).

5.5.16 Illumination

Where tank inspections require additional illumination, the light source will be intrinsically safe.

6.5 NOISE

The main sources of noise for the tasks performed under this HASP addendum are drilling rigs. Sound-level monitoring equipment will be used during operations to determine representative noise levels. The personal exposure limit for noise is 85 decibels on the A-weighted scale (dBA). Hearing protection will be used when noise levels are greater than 85 dBA. Employees will participate in the Jacobs Hearing Conservation program defined in the Jacobs Hearing Protection Conservation Policy (Appendix B in Primary HASP).

8.1 LEVELS OF PROTECTION

8.1.1 Personal Protective Equipment

Base levels of protection for activities covered by this HASP addendum may be level D, modified level D, level C, or level B. Specific protective equipment for each task at each tank is described in Appendix A and the Radiological Work Permits in Attachment One.

APPENDIX A

Appendix A describes Personal Protective Equipment and monitoring requirements for non-radioactive chemicals associated with specific tasks. The Radiation Work Permits in Attachment One list personal protective equipment and monitoring requirement for radiological hazards.

Site Location and Description:

OU	IHSS	TANK	LOCATION
9		T-1	South side of Building 122

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
Unknown VOC's		PID	0-2,000 ppm	5-20 ppm		>20 ppm	Monitor in BZ during Borehole & Groundwater Sampling.
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1	Use tubes if PID reads > background sustained.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH #1003	Sample if PID level C action levels reached.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	
Groundwater Samples		X			nitrile	Tyvek	GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9	122	T-2	Beneath & South of B441

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm	>20[1] ppm[1]	>20 ppm[2]	[1]During residue sampling. [2]During all other activities.
Inorganic acids		Detector Tube	1-80 ppm			15 ppm	Take tube reading upon opening tank for qualitative records
Possible metals		MIE miniram	0.1-100 mg/m^3	1.5-5 mg/m^3		≥5 mg/m^3	Use durng soil boring

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Inorganic acids	NIOSH 7903	During residue sampling, if acid tube > background and exposure time ≥ 1.5 hrs
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Surface Soil Sampling	X				silver shield				
Residue/Wipe Sampling			X		silver shield	Saranex	GMC-H		
Vault Water Sampling			X		silver shield	Saranex	GMC-H		
Borehole Samples		X			silver shield	Tyvek	GMC-H	hearing pro.	
Groundwater Samples		X			silver shield	Tyvek	GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9	122	T-3	South of B441

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
Ammonia	25 ppm	PID	0-2,000 ppm	12 ppm	250 ppm		
Possible metals		MIE miniram	0 1-100 mg/m³	1 5-5 mg/m³		≥5 mg/m³	Use during soil boring.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Ammonia	NIOSH 1 (205)	If PID level C action levels reached and potential exposure time ≥ 15 min.
Metals	NIOSH 7300	Sample if miniram level C action levels reached

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Exterior)	X				nitrile		GMD-H		
Surface Soil Sampling	X				nitrile		GMD-H		
Residue/Wipe Sampling			X		nitrile		GMD-H		
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro	
Groundwater Samples		X			nitrile		GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9	159	T-7	B528 Vault

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOCs		PID	0-2,000 ppm	5-20 ppm		>20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1 ppm	Use tubes if PID reads > background, sustained
Chloroform	2 ppm	Detector Tube Draeger	2-10 ppm			>2 ppm	Use tubes if PID reads > background, sustained
Possible metals		MIE miniram	0 1-100 mg/m³	1 5-5 mg/m³		≥5 mg/m³	Use during soil boring

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH1003	Sample if level C action levels reached
Metals	NISOH7300	Sample if level C action levels reached

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Borehole Samples		X			silver shields	Tyvek	GMC-H	hearing pro.	
Groundwater Samples		X			silver shields	Tyvek	GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9	132	T-10	B730

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOCs	>50 ppm	PID	0-2,000 ppm	25		250	
(TCA, TCE, Toluene)							
Carbon Tetrachloride	2 ppm	Detector Tube Sensidyne	1-60 ppm		>1 ppm[1]	>1 ppm[2]	Use tubes if PID> background sustained [1]During inspection or residue sampling [2]During all other activities
Oxygen Deficiency	<19 5%	O_2 monitor	0-100%		<19 5%		Use during confined space entry
Possible metals		MIE miniram	0 1-100 mg/m³	1-5 mg/m³		≥5 mg/m3	Use during soil boring

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogentated Hydrocarbons	NIOSH 1003	During confined space entry for inspection or residue sampling
Metals	NIOSH 7300	Sample if miniram level C action levels reached

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Interior)				X	nitrile	Saranex	GMC-H	harness & line	Confined space entry
Residue/Wipe Sampling				X	nitrile	Saranex	GMC-H	harness & line	Confined space entry
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro	
Groundwater Samples		X			nitrile	Tyvek	GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9		T-11, T-30	B731, East of B707

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's	>50 ppm	PID	0-2,000 ppm	5-20 ppm		>20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1 ppm	Use tubes if PID reads > background sustained.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogentated Hydrocarbons	NIOSH 1003	Sample if level C action levels reached.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Residue/Wipe Sampling		X			nitrile	Saranex	GMC-H		Saranex required if clothing contamination likely, otherwise Level D

Site Location and Description:

OU	IHSS	TANK	LOCATION
9	124	T-14, T-16	East of B774

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm		>20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1 ppm	Use tubes if PID reads > background sustained.
Possible Metals		MIE miniram	0.1-100 mg/m^3	1-5 mg/m^3		≥5 mg/m^3	Use during soil borings.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	Sample if applicable level C or B action levels reached
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X				nitrile	Tyvek	GMC-H		
Tank/Pipeline Inspection (interior)	X				nitrile	Tyvek	GMC-H		
Residue/Wipe Sampling	X				nitrile	Tyvek	GMC-H		
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro	
Groundwater Samples		X			nitrile	Tyvek	GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9	164 2	T-21, T-22	B828 vault, West of B886

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm			
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1 ppm	Use tubes if PID reads > background sustained.
Oxygen deficiency	19 5%	O_2 monitor	1-100%		≤19 5%		Comply w/ RWP

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	If level C, action levels are reached (on PID or detector tube)

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection	comply w/RWP								
Residue/Wipe Sampling	comply w/RWP								Knee-high boots for possible rattlesnakes, entering vault use illumination & probe
Vault Water Sampling	comply w/RWP								
Borehole Samples	comply w/RWP							Hearing pro.	
Groundwater Samples	comply w/RWP								

Site Location and Description:

OU	IHSS	TANK	LOCATION
9		T-27	North of B828

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm		>20 ppm	
Carbon Tetrachloride	2 ppm	Detector tubes	1-60 ppm			>1 ppm	Use tubes if PID reads > background sustained.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NOSH 1003	If level C action levels are exceeded.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Surface Soil	X				Nitrile	Saranex	GMC-H		

APPENDIX A

Site Location and Description.

OU	IHSS	TANK	LOCATION
9		T-29	South of B774, East of B703

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		PID	0-2,000 ppm		>5 ppm[1]	>5 ppm[2]	[1]During interior inspection or residue sampling.
Carbon Tetrachloride	2 ppm	Detector Tubes	1-60 ppm		>1 ppm[1]	>1 ppm[2]	[2]During all other activities.
Chloroform	2 ppm	Detector Tubes	2-10 ppm		>1 ppm[1]	>1 ppm[2]	Use tubes if PID> background sustained.
Hydrogen Cyanide	4.7 ppm(ST)	Detector Tubes			>2 ppm		Measure HCN and acids upon opening tank.
Inorganic Acids		Dectector Tubes	1-80 ppm			>15	
Oxygen Deficiency	<19.5%	02 detector			≤19.5%		
Possible Metals		MIE miniram	0 1-100 mg/m³	1 5-5 mg/m³		≥5 mg/m³	Use during soil boring.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Inorganic acids	NIOSH 7903	Sample during residue sampling if acid tube > background and exposure time > 1.5 hrs.
Halogenated Hydrocarbons	NIOSH 1003	Sample during residue sampling if PID Level B action level reached and exposure time > 1.5 hrs.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X				nitrile				
Tank/Pipeline Inspection (Interior)				X	silver shield	Level B - Serenex	GMC-H	fall pro.	possible work at heights
Tank/Pipeline Inspection (Exterior)	X				silver shield				
Surface Soil Sampling	X				silver shield	Serenex	GMC-H	harness & line	possible work at heights
Residue/Wipe Sampling				X	silver shield	Level B - Serenex	GMC-H		
Vault Water Sampling		X			silver shield	Tyvek	GMC-H	hearing pro	
Borehole/Groundwater Samples		X			silver shield	Tyvek	GMC-H		

Site Location and Description:

OU	IHSS	TANK	LOCATION
9		T-40	West fo B889

Suspect Contaminants:

MONITORING REQUIREMENTS				ACTION LEVELS			
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm	>20 ppm[1]	>20 ppm[2]	[1]During interior inspection and residue sampling.
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm		>1 ppm[1]	>1 ppm	[2]During all other activities.
Sulfuric Acid	1 mg/m³	Detector Tube	1-5 mg/m³			5 mg/m³	Measure sulfuric acid upon opening tank.
Oxygen Deficiency	<19.5%	O2 monitor			<19.5%		Measure O_2 prior to and during entry.
Possible metals		MIE miniram	0.1-100 mg/m³	1 5-5 mg/m³		≥5 mg/m³	Use during soil borings.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	NIOSH 1003	Sample during residue sampling.
Metals	NIOSH 7300	Sample if miniram level C action levels reached.

Personal Protective Equipment:

	Start Level of Protection				Specific PPE To Use, When Required By Level Of Protection				
Type of Work	Level D	Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Radiation Survey	X								
Tank/Pipeline Inspection (Interior)			X		nitrile	Saranex	GMC-H	harness & line	confined space entry.
Residue/Wipe Sampling			X		nitrile	Saranex	GMC-H	harness & line	confined space entry.
Vault Water Sampling	X								Saranex if vault entry required. Saranex required if clothing contamination likely, otherwise Level D.
Borehole Samples		X			nitrile	Tyvek	GMC-H	hearing pro.	
Groundwater Samples		X			nitrile	Tyvek	GMC-H		

ATTACHMENT ONE

Radiological Work Permits (RWPs)

ATTACHMENT TWO

ALARA Review Plans